



SEQUENCE LISTING

<110> SAARMA, Mart et al.

<120> NOVEL NEUROTROPHIC FACTOR PROTEIN AND USES THEREOF

<130> 0933-0210P

<140> US 10/648,361

<141> 2003-08-27

<150> US 60/406,927

<151> 2002-08-30

<160> 22

<170> PatentIn version 3.2

<210> 1

<211> 564

<212> DNA

<213> Homo sapiens

<220>

<221> CDS

<222> (1)..(564)

<400> 1

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Met Trp Cys Ala Ser Pro Val Ala Val Val Ala Phe Cys Ala Gly Leu	
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ttg gtc tct cac ccg gtg ctg acg cag ggc cag gag gcc ggg ggg cgg	96
Leu Val Ser His Pro Val Leu Thr Gln Gly Gln Glu Ala Gly Gly Arg	
20 25 30	
cca ggg gcc gac tgt gaa gta tgt aaa gaa ttc ttg aac cga ttc tac	144
Pro Gly Ala Asp Cys Glu Val Cys Lys Glu Phe Leu Asn Arg Phe Tyr	
35 40 45	
aag tca ctg ata gac aga gga gtt aac ttt tcg ctg gac act ata gag	192
Lys Ser Leu Ile Asp Arg Gly Val Asn Phe Ser Leu Asp Thr Ile Glu	
50 55 60	
aaa gaa ttg atc agt ttt tgc ttg gac acc aaa gga aaa gaa aac cgc	240
Lys Glu Leu Ile Ser Phe Cys Leu Asp Thr Lys Gly Lys Glu Asn Arg	
65 70 75 80	
ctg tgc tat tat cta gga gcc aca aaa gac gca gcc aca aag atc cta	288
Leu Cys Tyr Tyr Leu Gly Ala Thr Lys Asp Ala Ala Thr Lys Ile Leu	
85 90 95	
agt gaa gtc act cgc cca atg agt gtg cat atg cct gca atg aag att	336
Ser Glu Val Thr Arg Pro Met Ser Val His Met Pro Ala Met Lys Ile	
100 105 110	
tgt gag aag ctg aag aag ttg gat agc cag atc tgt gag ctg aaa tat	384

Cys	Glu	Lys	Leu	Lys	Lys	Leu	Asp	Ser	Gln	Ile	Cys	Glu	Leu	Lys	Tyr		
		115					120					125					
gaa	aaa	aca	ctg	gac	ttg	gca	tca	gtt	gac	ctg	cgg	aag	atg	aga	gtg	432	
Glu	Lys	Thr	Leu	Asp	Leu	Ala	Ser	Val	Asp	Leu	Arg	Lys	Met	Arg	Val		
	130					135					140						
gca	gag	ctg	aag	cag	atc	ctg	cat	agc	tgg	ggg	gag	gag	tgc	agg	gcc	480	
Ala	Glu	Leu	Lys	Gln	Ile	Leu	His	Ser	Trp	Gly	Glu	Glu	Cys	Arg	Ala		
145					150					155					160		
tgt	gca	gaa	aaa	act	gac	tat	gtg	aat	ctc	att	caa	gag	ctg	gcc	ccc	528	
Cys	Ala	Glu	Lys	Thr	Asp	Tyr	Val	Asn	Leu	Ile	Gln	Glu	Leu	Ala	Pro		
				165					170						175		
aag	tat	gca	gcg	aca	cac	ccc	aaa	aca	gag	ctc	tga					564	
Lys	Tyr	Ala	Ala	Thr	His	Pro	Lys	Thr	Glu	Leu							
			180					185									

<210> 2  
 <211> 187  
 <212> PRT  
 <213> Homo sapiens

<400> 2																	
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			20					25					30				
Pro	Gly	Ala	Asp	Cys	Glu	Val	Cys	Lys	Glu	Phe	Leu	Asn	Arg	Phe	Tyr		
		35					40					45					
Lys	Ser	Leu	Ile	Asp	Arg	Gly	Val	Asn	Phe	Ser	Leu	Asp	Thr	Ile	Glu		
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Lys	Glu	Leu	Ile	Ser	Phe	Cys	Leu	Asp	Thr	Lys	Gly	Lys	Glu	Asn	Arg		
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Leu	Cys	Tyr	Tyr	Leu	Gly	Ala	Thr	Lys	Asp	Ala	Ala	Thr	Lys	Ile	Leu		
			85					90					95				
Ser	Glu	Val	Thr	Arg	Pro	Met	Ser	Val	His	Met	Pro	Ala	Met	Lys	Ile		
			100					105					110				
Cys	Glu	Lys	Leu	Lys	Lys	Leu	Asp	Ser	Gln	Ile	Cys	Glu	Leu	Lys	Tyr		
	115					120						125					
Glu	Lys	Thr	Leu	Asp	Leu	Ala	Ser	Val	Asp	Leu	Arg	Lys	Met	Arg	Val		
	130					135					140						
Ala	Glu	Leu	Lys	Gln	Ile	Leu	His	Ser	Trp	Gly	Glu	Glu	Cys	Arg	Ala		
145					150					155					160		
Cys	Ala	Glu	Lys	Thr	Asp	Tyr	Val	Asn	Leu	Ile	Gln	Glu	Leu	Ala	Pro		
			165					170							175		
Lys	Tyr	Ala	Ala	Thr	His	Pro	Lys	Thr	Glu	Leu							
			180					185									

<210> 3  
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 <212> DNA  
 <213> Mus musculus

<220>

<221> CDS

<222> (1)..(564)

<400> 3

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1				5					10					15		
tgt	atc	tcg	aac	cct	gtg	ctg	gcg	cag	ggc	ctg	gag	gcc	ggg	gtg	ggg	96
Cys	Ile	Ser	Asn	Pro	Val	Leu	Ala	Gln	Gly	Leu	Glu	Ala	Gly	Val	Gly	
			20					25					30			
ccg	agg	gct	gac	tgt	gaa	gta	tgt	aaa	gaa	ttc	tta	gac	cga	ttc	tac	144
Pro	Arg	Ala	Asp	Cys	Glu	Val	Cys	Lys	Glu	Phe	Leu	Asp	Arg	Phe	Tyr	
		35					40					45				
aac	tcc	ctg	cta	agc	aga	ggc	ata	gac	ttt	tct	gcg	gac	acc	ata	gag	192
Asn	Ser	Leu	Leu	Ser	Arg	Gly	Ile	Asp	Phe	Ser	Ala	Asp	Thr	Ile	Glu	
	50					55					60					
aaa	gag	ctg	ctc	aac	ttt	tgc	tca	gat	gcc	aaa	gga	aaa	gaa	aac	cgc	240
Lys	Glu	Leu	Leu	Asn	Phe	Cys	Ser	Asp	Ala	Lys	Gly	Lys	Glu	Asn	Arg	
65				70					75					80		
ctg	tgc	tat	tat	ctg	ggg	gcc	acc	aca	gat	gca	gcc	acc	aag	atc	cta	288
Leu	Cys	Tyr	Tyr	Leu	Gly	Ala	Thr	Thr	Asp	Ala	Ala	Thr	Lys	Ile	Leu	
				85					90					95		
gga	gaa	gtc	act	cgt	ccc	atg	agt	gta	cac	ata	cct	gcc	gtg	aag	att	336
Gly	Glu	Val	Thr	Arg	Pro	Met	Ser	Val	His	Ile	Pro	Ala	Val	Lys	Ile	
			100					105					110			
tgt	gag	aag	cta	aag	aag	atg	gac	agc	cag	atc	tgt	gag	ctg	aaa	tac	384
Cys	Glu	Lys	Leu	Lys	Lys	Met	Asp	Ser	Gln	Ile	Cys	Glu	Leu	Lys	Tyr	
		115					120					125				
ggg	aag	aag	ctg	gac	ttg	gcg	tcg	gtg	gac	ctg	tgg	aag	atg	aga	gtg	432
Gly	Lys	Lys	Leu	Asp	Leu	Ala	Ser	Val	Asp	Leu	Trp	Lys	Met	Arg	Val	
	130					135					140					
gca	gag	cta	aag	cag	atc	ctt	cag	aga	tgg	ggg	gaa	gag	tgc	agg	gca	480
Ala	Glu	Leu	Lys	Gln	Ile	Leu	Gln	Arg	Trp	Gly	Glu	Glu	Cys	Arg	Ala	
145					150					155					160	
tgt	gcg	gag	aaa	agt	gac	tac	gtg	aac	ctc	att	aga	gag	ctg	gcc	ccc	528
Cys	Ala	Glu	Lys	Ser	Asp	Tyr	Val	Asn	Leu	Ile	Arg	Glu	Leu	Ala	Pro	
				165					170					175		
aaa	tat	gta	gag	ata	tac	ccc	caa	acg	gag	ctc	tga					564
Lys	Tyr	Val	Glu	Ile	Tyr	Pro	Gln	Thr	Glu	Leu						
			180					185								

<210> 4

<211> 187

<212> PRT  
<213> Mus musculus

<400> 4  
Met Arg Cys Ile Ser Pro Thr Ala Leu Val Thr Phe Cys Ala Gly Phe  
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20 25 30  
Pro Arg Ala Asp Cys Glu Val Cys Lys Glu Phe Leu Asp Arg Phe Tyr  
35 40 45  
Asn Ser Leu Leu Ser Arg Gly Ile Asp Phe Ser Ala Asp Thr Ile Glu  
50 55 60  
Lys Glu Leu Leu Asn Phe Cys Ser Asp Ala Lys Gly Lys Glu Asn Arg  
65 70 75 80  
Leu Cys Tyr Tyr Leu Gly Ala Thr Thr Asp Ala Ala Thr Lys Ile Leu  
85 90 95  
Gly Glu Val Thr Arg Pro Met Ser Val His Ile Pro Ala Val Lys Ile  
100 105 110  
Cys Glu Lys Leu Lys Lys Met Asp Ser Gln Ile Cys Glu Leu Lys Tyr  
115 120 125  
Gly Lys Lys Leu Asp Leu Ala Ser Val Asp Leu Trp Lys Met Arg Val  
130 135 140  
Ala Glu Leu Lys Gln Ile Leu Gln Arg Trp Gly Glu Glu Cys Arg Ala  
145 150 155 160  
Cys Ala Glu Lys Ser Asp Tyr Val Asn Leu Ile Arg Glu Leu Ala Pro  
165 170 175  
Lys Tyr Val Glu Ile Tyr Pro Gln Thr Glu Leu  
180 185

<210> 5  
<211> 26  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
Oligonucleotide primer

<400> 5  
accatgcggt gcatcagttcc aactgc

26

<210> 6  
<211> 23  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
Oligonucleotide primer

<400> 6  
ctcatgggac gactgacttc tcc

23

<210> 7

<211> 26  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:  
         Oligonucleotide primer  
  
 <400> 7  
 gtcagagctc cgtttggggg tatatc 26  
  
  
 <210> 8  
 <211> 22  
 <212> DNA  
 <213> Artificial Sequence  
  
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 <223> Description of Artificial Sequence:  
         Oligonucleotide primer  
  
 <400> 8  
 gagctccgtt tgggggtata tc 22  
  
  
 <210> 9  
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 <223> Description of Artificial Sequence:  
         Oligonucleotide primer  
  
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 accatgtggt ggcgcgagccc agttgc 26  
  
  
 <210> 10  
 <211> 25  
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 gcacactcat tgggcgagtg acttc 25  
  
  
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<223> Description of Artificial Sequence:  
Oligonucleotide primer

<400> 11  
gatcagagct ctgttttggg gtgtgtc 27

<210> 12  
<211> 22  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:  
Oligonucleotide primer

<400> 12  
gagctctgtt ttggggtgtg tc 22

<210> 13  
<211> 179  
<212> PRT  
<213> Homo Sapiens

<400> 13

Met Trp Ala Thr Gln Gly Leu Ala Val Arg Val Ala Leu Ser Val Leu  
1 5 10 15

Pro Gly Ser Arg Ala Leu Arg Pro Gly Asp Cys Glu Val Cys Ile Ser  
20 25 30

Tyr Leu Gly Arg Phe Tyr Gln Asn Leu Lys Asp Arg Asp Val Thr Phe  
35 40 45

Ser Pro Ala Thr Ile Glu Asn Glu Leu Ile Lys Phe Cys Arg Glu Ala  
50 55 60

Arg Gly Lys Glu Asn Arg Leu Cys Tyr Tyr Ile Gly Ala Thr Asp Asp  
65 70 75 80

Ala Ala Thr Lys Ile Ile Asn Glu Val Ser Lys Pro Leu Ala His His  
85 90 95

Ile Pro Val Glu Lys Ile Cys Glu Lys Leu Lys Lys Lys Asp Ser Gln  
100 105 110

Ile Cys Glu Leu Lys Tyr Asp Lys Gln Ile Asp Leu Ser Thr Val Asp  
115 120 125

Leu Lys Lys Leu Arg Val Lys Glu Leu Lys Lys Ile Leu Asp Asp Trp  
130 135 140

Gly Glu Thr Cys Lys Gly Cys Ala Glu Lys Ser Asp Tyr Ile Arg Lys  
145 150 155 160

Ile Asn Glu Leu Met Pro Lys Tyr Ala Pro Lys Ala Ala Ser Ala Pro  
165 170 175

Thr Asp Leu

<210> 14  
<211> 153  
<212> PRT  
<213> Mus musculus

<400> 14

Cys Glu Val Cys Ile Ser Tyr Leu Gly Arg Phe Tyr Gln Asp Leu Lys  
1 5 10 15

Asp Arg Asp Val Thr Phe Ser Pro Ala Thr Ile Glu Glu Glu Leu Ile  
20 25 30

Lys Phe Cys Arg Glu Ala Arg Gly Lys Glu Asn Arg Leu Cys Tyr Tyr  
35 40 45

Ile Gly Ala Thr Asp Asp Ala Ala Thr Lys Ile Ile Asn Glu Val Ser  
50 55 60

Lys Pro Leu Ala His His Ile Pro Val Glu Lys Ile Cys Glu Lys Leu  
65 70 75 80

Lys Lys Lys Asp Ser Gln Ile Cys Glu Leu Lys Tyr Asp Lys Gln Ile  
85 90 95

Asp Leu Ser Thr Val Asp Leu Lys Lys Leu Arg Val Lys Glu Leu Lys  
100 105 110

Lys Ile Leu Asp Asp Trp Gly Glu Met Cys Lys Gly Cys Ala Glu Lys  
115 120 125

Ser Asp Tyr Ile Arg Lys Ile Asn Glu Leu Met Pro Lys Tyr Ala Pro  
130 135 140

Lys Ala Ala Ser Ala Arg Thr Asp Leu  
145 150

<210> 15  
<211> 153  
<212> PRT  
<213> Rattus norvegicus

<400> 15

Cys Glu Val Cys Ile Ser Tyr Leu Gly Arg Phe Tyr Gln Asp Leu Lys  
1 5 10 15

Asp Arg Asp Val Thr Phe Ser Pro Ala Thr Ile Glu Glu Glu Leu Ile  
20 25 30

Lys Phe Cys Arg Glu Ala Arg Gly Lys Glu Asn Arg Leu Cys Tyr Tyr  
35 40 45

Ile Gly Ala Thr Asp Asp Ala Ala Thr Lys Ile Ile Asn Glu Val Ser  
50 55 60

Lys Pro Leu Ala His His Ile Pro Val Glu Lys Ile Cys Glu Lys Leu  
65 70 75 80

Lys Lys Lys Asp Ser Gln Ile Cys Glu Leu Lys Tyr Asp Lys Gln Ile  
85 90 95

Asp Leu Ser Thr Val Asp Leu Lys Lys Leu Arg Val Lys Glu Leu Lys  
100 105 110

Lys Ile Leu Asp Asp Trp Gly Glu Met Cys Lys Gly Cys Ala Glu Lys  
115 120 125

Ser Asp Tyr Ile Arg Lys Ile Asn Glu Leu Met Pro Lys Tyr Ala Pro  
130 135 140

Lys Ala Ala Ser Ala Arg Thr Asp Leu  
145 150

<210> 16  
<211> 153



<212> PRT  
<213> Bos Taurus

<400> 16

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Asp Arg Asp Val Thr Phe Ser Pro Ala Ser Ile Glu Lys Glu Leu Ile  
20 25 30

Lys Phe Cys Arg Glu Ala Arg Gly Lys Glu Asn Arg Leu Cys Tyr Tyr  
35 40 45

Ile Gly Ala Thr Glu Asp Ala Ala Thr Lys Ile Ile Asn Glu Val Ser  
50 55 60

Lys Pro Leu Ser His His Ile Pro Val Glu Lys Ile Cys Glu Lys Leu  
65 70 75 80

Lys Lys Lys Asp Ser Gln Ile Cys Glu Leu Lys Tyr Asp Lys Gln Ile  
85 90 95

Asp Leu Ser Thr Val Asp Leu Lys Lys Leu Arg Val Lys Glu Leu Lys  
100 105 110

Lys Ile Leu Asp Asp Trp Gly Glu Thr Cys Lys Gly Cys Ala Glu Lys  
115 120 125

Ser Asp Tyr Ile Arg Lys Ile Asn Glu Leu Met Pro Lys Tyr Ala Pro  
130 135 140

Lys Ala Ala Ser Ser Arg Thr Asp Leu  
145 150

<210> 17  
<211> 153  
<212> PRT  
<213> Gallus gallus

<220>  
<221> misc\_feature  
<222> (123)..(124)  
<223> Xaa can be any naturally occurring amino acid

<400> 17

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Asp Asn Asn Val Glu Phe Thr Pro Ala Ser Ile Glu Lys Glu Leu Met  
20 25 30

Lys Ser Cys Arg Glu Ala Lys Gly Lys Glu Asn Arg Leu Cys Tyr Tyr  
35 40 45

Ile Gly Ala Thr Ser Asp Ala Ala Thr Lys Ile Ile Asn Glu Val Ser  
50 55 60

Lys Pro Met Ser His His Ile Pro Val Glu Lys Ile Cys Glu Lys Leu  
65 70 75 80

Lys Lys Lys Asp Ser Gln Ile Cys Glu Leu Lys Tyr Asp Lys Gln Ile  
85 90 95

Asp Leu Ser Thr Ala Asp Leu Arg Lys Leu Arg Val Lys Glu Leu Arg  
100 105 110

Arg Ile Leu Asp Asp Trp Gly Glu Ala Cys Xaa Xaa Cys Ala Glu Lys  
115 120 125

Ser Asp Phe Ile Arg Arg Ile His Glu Leu Met Pro Lys Tyr Ala Pro  
130 135 140

Arg Ala Ala Gly Ala Arg Ala Asp Leu  
145 150

<210> 18  
<211> 153  
<212> PRT  
<213> Xenopus laevis

<400> 18

Cys Glu Val Cys Val Ser Phe Leu Ser Arg Phe Tyr Gln Ser Leu Lys  
1 5 10 15

Glu Arg Gln Val Glu Phe Lys Pro Asp Ala Val Glu Lys Glu Leu Leu  
20 25 30

Lys Thr Cys Asn Asp Ala Arg Gly Lys Glu Asn Arg Leu Cys Tyr Tyr

35

40

45

Ile Gly Ala Thr Ser Asp Ala Ala Thr Lys Ile Thr Asn Glu Val Ser  
 50 55 60

Lys Pro Leu Ser His His Ile Pro Ala Glu Lys Ile Cys Glu Lys Leu  
 65 70 75 80

Lys Lys Lys Asp Gly Gln Ile Cys Glu Leu Lys Tyr Asp Lys Gln Ile  
 85 90 95

Asp Leu Ser Thr Val Asp Leu Lys Lys Leu Lys Val Lys Glu Leu Lys  
 100 105 110

Lys Ile Leu Asp Asp Trp Gly Glu Ser Cys Lys Gly Cys Ala Glu Lys  
 115 120 125

Ser Asp Phe Ile Arg Lys Ile Asn Glu Leu Met Pro Lys Tyr Ala Pro  
 130 135 140

His Ala Ala Asn Ala Arg Thr Asp Leu  
 145 150

<210> 19  
 <211> 153  
 <212> PRT  
 <213> Fugu rubribes

<400> 19

Cys Pro Val Cys Ile Ala Phe Leu Gly Arg Phe Tyr Asp Ser Leu Lys  
 1 5 10 15

Asp Asn Glu Val Ala Phe Asn Asn Val Asp Ile Glu Lys Ala Leu Thr  
 20 25 30

Lys Ser Cys Asn Asp Ala Lys Gly Lys Glu Asn Arg Gln Cys Tyr Tyr  
 35 40 45

Ile Gly Ala Thr Ser Asp Ala Ala Thr Lys Met Ile Asn Glu Val Ser  
 50 55 60

Lys Pro Met Ser His His Val Pro Val Glu Lys Ile Cys Glu Lys Leu  
 65 70 75 80

Lys Lys Lys Asp Ser Gln Ile Cys Glu Leu Lys Tyr Asp Lys Gln Leu  
85 90 95

Asp Leu Ser Thr Val Asp Leu Lys Lys Leu Lys Val Lys Asp Leu Lys  
100 105 110

Lys Val Leu Glu Asp Trp Gly Glu Ser Cys Lys Gly Cys Ala Glu Lys  
115 120 125

Ser Asp Phe Ile Arg Lys Ile Thr Glu Leu Met Pro Lys Tyr Ala Pro  
130 135 140

Ala Ala Ala Arg Ala Arg Thr Glu Leu  
145 150

<210> 20  
<211> 153  
<212> PRT  
<213> Danio rerio

<400> 20

Cys Glu Val Cys Val Gly Phe Leu Gln Arg Leu Tyr Gln Thr Ile Gln  
1 5 10 15

Glu Asn Asn Val Lys Phe Asp Ser Asp Ser Ile Glu Lys Ala Leu Leu  
20 25 30

Lys Ser Cys Lys Asp Ala Lys Gly Lys Glu Asn Arg Phe Cys Tyr Tyr  
35 40 45

Ile Gly Ala Thr Ser Asp Ala Ala Thr Lys Ile Thr Asn Glu Val Ser  
50 55 60

Lys Pro Met Ser Tyr His Val Pro Val Glu Lys Ile Cys Glu Lys Leu  
65 70 75 80

Lys Lys Lys Asp Ser Gln Ile Cys Glu Leu Lys Tyr Asp Lys Gln Val  
85 90 95

Asp Leu Ser Ser Val Asp Leu Lys Lys Leu Lys Val Lys Asp Leu Lys  
100 105 110

Lys Ile Leu Glu Glu Trp Gly Glu Ser Cys Lys Gly Cys Val Glu Lys

115

120

125

Ser Asp Phe Ile Arg Lys Ile Asn Glu Leu Met Pro Lys Tyr Ala Pro  
 130 135 140

Ser Ala Ala Lys Ala Arg Thr Asp Leu  
 145 150

<210> 21  
 <211> 146  
 <212> PRT  
 <213> Drosophila melanogaster

<400> 21

Cys Glu Val Cys Val Lys Thr Val Arg Arg Phe Ala Asp Ser Leu Asp  
 1 5 10 15

Asp Ser Thr Lys Lys Asp Tyr Lys Gln Ile Glu Thr Ala Phe Lys Lys  
 20 25 30

Phe Cys Lys Ala Gln Lys Asn Lys Glu His Arg Phe Cys Tyr Tyr Leu  
 35 40 45

Gly Gly Leu Glu Glu Ser Ala Thr Gly Ile Leu Asn Glu Leu Ser Lys  
 50 55 60

Pro Leu Ser Trp Ser Met Pro Ala Glu Lys Ile Cys Glu Lys Leu Lys  
 65 70 75 80

Lys Lys Asp Ala Gln Ile Cys Asp Leu Arg Tyr Glu Lys Gln Ile Asp  
 85 90 95

Leu Asn Ser Val Asp Leu Lys Lys Leu Lys Val Arg Asp Leu Lys Lys  
 100 105 110

Ile Leu Asn Asp Trp Asp Glu Ser Cys Asp Gly Cys Leu Glu Lys Gly  
 115 120 125

Asp Phe Ile Lys Arg Ile Glu Glu Leu Lys Pro Lys Tyr Ser Arg Ser  
 130 135 140

Glu Leu  
 145

<210> 22  
<211> 147  
<212> PRT  
<213> Canorhabditis elegans

<400> 22

Cys Glu Val Cys Lys Lys Val Leu Asp Asp Val Met Ala Lys Val Pro  
1 5 10 15

Ala Gly Asp Lys Ser Lys Pro Asp Ala Ile Gly Lys Val Ile Arg Glu  
20 25 30

His Cys Glu Thr Thr Arg Asn Lys Glu Asn Lys Phe Cys Phe Tyr Ile  
35 40 45

Gly Ala Leu Pro Glu Ser Ala Thr Ser Ile Met Asn Glu Val Thr Lys  
50 55 60

Pro Leu Ser Trp Ser Met Pro Thr Glu Lys Val Cys Leu Glu Lys Leu  
65 70 75 80

Lys Gly Lys Asp Ala Gln Ile Cys Glu Leu Lys Tyr Asp Lys Pro Leu  
85 90 95

Asp Trp Lys Thr Ile Asp Leu Lys Lys Met Arg Val Lys Glu Leu Lys  
100 105 110

Asn Ile Leu Gly Glu Trp Gly Glu Val Cys Lys Gly Cys Thr Glu Lys  
115 120 125

Ala Glu Leu Ile Lys Arg Ile Glu Glu Leu Lys Pro Lys Tyr Val Lys  
130 135 140

Glu Glu Leu  
145